

WHAT IS CLAIMED IS:

1 1. Device for protecting a bearing of an electrical machine against
2 damaging passage of current, wherein the electrical machine comprises a
3 stator and a rotor pivotally mounted relative to the stator by the bearing, the
4 device comprising a compensation circuit for producing a compensation
5 current which compensates for a parasitic current arising during operation of
6 the electrical machine and passing through the bearing and a coupling
7 element for direct or indirect coupling of the compensation current into the
8 bearing.

1 2. The device according to Claim 1, wherein the compensation
2 circuit comprises an artificial star point which prepares a star point voltage at
3 which phase voltages for operation of the electrical machine are found.

1 3. The device according to Claim 2, wherein the artificial star point
2 is formed by three identical impedances.

1 4. The device according to Claim 3, wherein the compensation
2 circuit also comprises a polarity reversal transformer having a primary side
3 to which the star point voltage is supplied at least in part and a secondary
4 side which produces a voltage opposite in phase to the star point voltage.

1 5. The device according to Claim 4, wherein the compensation
2 circuit also comprises an amplitude matching stage connected between the
3 artificial star point and the polarity reversal transformer, the amplitude
4 matching stage applying an adjustable fraction of the star point voltage to
5 the polarity reversal transformer.

1 6. The device according to Claim 5, wherein the polarity reversal
2 transformer has several winding taps on the secondary side.

1 7. The device according to Claim 6, wherein the polarity reversal
2 transformer is connected on the secondary side to an input of a frequency
3 response matching stage which equalizes a frequency response of the
4 compensation current to the parasitic current.

1 8. The device according to Claim 7, wherein an output of the
2 frequency response matching stage is connected to the coupling element.

1 9. The device according to Claim 8, wherein the coupling element
2 is arranged such that coupling of the compensation current takes place into

3 a rotor shaft of the rotor by which the rotor in the bearing is pivotally
4 mounted.

1 10. The device according to Claim 9, wherein the coupling element
2 is a capacitor.

1 11. The device according to Claim 2, wherein the compensation
2 circuit also comprises a polarity reversal transformer having a primary side
3 to which the star point voltage is supplied at least in part and a secondary
4 side which produces a voltage opposite in phase to the star point voltage.

1 12. The device according to Claim 11, wherein the compensation
2 circuit also comprises an amplitude matching stage connected between the
3 artificial star point and the polarity reversal transformer, the amplitude
4 matching stage applying an adjustable fraction of the star point voltage to
5 the polarity reversal transformer.

1 13. The device according to Claim 11, wherein the polarity reversal
2 transformer has several winding taps on the secondary side.

1 14. The device according to Claim 11, wherein the polarity reversal
2 transformer is connected on the secondary side to an input of a frequency
3 response matching stage which equalizes a frequency response of the
4 compensation current to the parasitic current.

1 15. The device according to Claim 14, wherein an output of the
2 frequency response matching stage is connected to a coupling element.

1 16. The device according to Claim 15, wherein the coupling element
2 is arranged such that coupling of the compensation current takes place into
3 a rotor shaft of the rotor by which the rotor in the bearing is pivotally
4 mounted.

1 17. The device according to Claim 15, wherein the coupling element
2 is a capacitor.

1 18. Device for protecting a bearing, which supports a rotor of an
2 electrical machine, against passage of parasitic current arising from
3 operation of the electrical machine, the device comprising means for
4 producing a compensation current corresponding in magnitude to the

5 parasitic current but opposite in phase to the parasitic current, and coupling
6 means for coupling the compensation current into the bearing.

1 19. The device according to Claim 18, wherein the means for
2 producing compensation current comprises an artificial star point which
3 prepares a star point voltage at which phase voltages for operation of the
4 electrical machine exist.

1 20. The device according to Claim 19, wherein the compensation
2 circuit also comprises a polarity reversal transformer having one side to
3 which the star point voltage is at least partly supplied and a second side
4 which produces a voltage opposite in phase to the star point voltage.

1 21. The device according to Claim 20, wherein the compensation
2 circuit also comprises an amplitude matching stage connected between the
3 artificial star point and the polarity reversal transformer, the amplitude
4 matching stage applying an adjustable fraction of the star point voltage to
5 the polarity reversal transformer.

- 1 22. The device according to Claim 18, wherein the coupling means
- 2 couples the compensation current to the bearing element either directly or
- 3 indirectly.